



# Radiation dose in paediatric CT during and after changes

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## Background

The discovery of clinical CT revolutionized imaging for medical purposes. Past few years CT scans have had rapid technological development which has led to an increase in CT examinations in recent years. CT examinations use ionizing radiation and children are more sensitive to it than adults. With more knowledge on effects of ionizing radiation and increase in CT examinations it has led CT manufactures to produce various technical elements to keep radiation as low as reasonably achievable (ALARA)



## Methods

Data was collected retrospectively for all paediatric examinations in the year 2018 from three radiology departments. Dose data was categorized in five age groups for the four most common body parts (head, abdomen, thorax and sinuses). For each study, effective diameter was measured and SSDE were calculated for abdomen and chest. Based on the collected data an advise on dose optimization was given to the largest department, in which new equipment was being installed (late 18' through early 19'). The effect was evaluated by gathering identical dose data for the year 2019 and then analyse the difference, where enough data was available, between four six months periods. The first and last periods represent the status pre and post changes. A statistical t.test was done to examine the significant difference between pre and post changes.

## Results

The total number of studies was 2068, 15.8 % increase between years. Boys were the majority. The most common age group was 8-14 years and CT head was the most common body part examined. Significant dose reduction ( $p < 0.05$ ) was seen in the age groups 2m-2y, 8y-14y, 15y-18y for head, and in addition in abdomen in the age group 3y-7y. 19.1% of patients were in the age group 15-18 years but for the abdomen, thorax and sinuses examinations in that age group it was not possible to confirm any dose reduction.

## Conclusion

New equipment and dose optimization advise resulted in dose reduction in some, but not all, examinations. It was noted that adult protocols were often used for the oldest children which may explain the unexpected results. The paediatric protocols were set correctly but they were not being used properly. Some hospitals have a lot of paediatric protocols for similar examinations and it can affect the use of the protocols. It could lead to different amount of radiation doses for the same size of children for the same examinations. CT scans should have paediatric protocols available and they should be used properly.

